

What is claimed is:

1. A barrier sheet, comprising:
 - a thermoplastic substrate; and
 - 5 a transparent barrier film disposed on the substrate, the transparent barrier film comprising:
 - a smoothing layer disposed on the substrate; and
 - a first layer of oxygen barrier material covering the smoothing layer.
- 10 2. The sheet of claim 1, wherein the smoothing layer is a first crosslinked acrylate layer.
3. The sheet of claim 2, wherein the first crosslinked acrylate layer is a polymerization product of acrylate monomer having a molecular weight in the range from 150 to 600.
- 15 4. The sheet of claim 2, wherein the transparent barrier film further comprises:
 - a second crosslinked acrylate layer disposed on the first layer of oxygen barrier material.
5. The sheet of claim 4, wherein the transparent barrier film further comprises:
 - 20 a second layer of oxygen barrier material disposed on the second crosslinked acrylate layer; and
 - a third crosslinked acrylate layer disposed on the second layer of oxygen barrier material.
- 25 6. The sheet of claim 1, wherein the oxygen barrier material comprises a transparent oxide.
7. The sheet of claim 6, wherein the oxygen barrier material comprises SiO_x .
8. The sheet of claim 6, wherein the oxygen barrier material comprises aluminum oxide.

9. A package, comprising the barrier sheet of claim 1.

10. A method of making a barrier sheet, comprising:

- 5 providing a thermoplastic substrate; and
 forming a transparent barrier film on the substrate, the forming step including:
 applying a smoothing layer to the thermoplastic substrate; and
 applying a first layer of oxygen barrier material to the smoothing layer.

10 11. The method of claim 10, wherein the step of applying a smoothing layer comprises
applying an acrylate monomer composition to the thermoplastic substrate and crosslinking the
acrylate monomer composition.

15 12. The method of claim 11, wherein the acrylate monomer composition is applied to the
thermoplastic substrate by flash evaporation.

13. The method of claim 11, wherein the step of applying a smoothing layer forms a first
crosslinked acrylate layer on the thermoplastic substrate, and wherein the step of forming a
transparent barrier film further includes:
20 forming a second crosslinked acrylate layer on the first layer of oxygen barrier
 material;
 forming a second layer of oxygen barrier material on the second crosslinked
 acrylate layer; and
 forming a third crosslinked acrylate layer on the second layer of oxygen barrier
25 material.

14. The method of claim 10, wherein the forming step further includes:

- applying a protective layer to the first layer of oxygen barrier material.

15. The method of claim 14, wherein the step of applying a protective layer comprises applying an acrylate monomer composition to the thermoplastic substrate and crosslinking the acrylate monomer composition.
- 5 16. The method of claim 10, wherein the forming step is carried out in a vacuum chamber.
17. The method of claim 10, wherein the first layer of oxygen barrier material is applied to the smoothing layer by sputtering.
- 10 18. The method of claim 10, wherein the first layer of oxygen barrier material is applied to the smoothing layer by plasma enhanced chemical vapor deposition.
19. The method of claim 10, wherein the thermoplastic substrate is a roll of sheet material.
- 15 20. The method of claim 10, further comprising plasma treating the thermoplastic substrate before applying the smoothing layer to the thermoplastic substrate.